UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: ECL-113

October 2, 2001

Ms. Katie Hain, Manager
Environmental Restoration Program
U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

Re: Comments on the 60% Remedial Design Components for the ICDF, Group 3, Operable Unit 3-13.

Dear Ms. Hain:

We have reviewed the Operable Unit 3-13, Waste Area Group (WAG) 3, 60% Design Components received September 4, 2001. We very much appreciate this opportunity to provide comments at the 60% design stage, as it should significantly reduce design issue conflicts that arise with the 90% submission. Our comments are enclosed.

Please note that those comments marked with a "**" are particular concern. Our comments address the CERCLA evaluation criteria under the National Contingency Plan and include Best Management Practices. Please contact me at (206) 553-7261, if I can be of further assistance.

Sincerely,

Wayne Pierre
Project Manager

Enclosure:

cc: Dean Nygard, IDHW
Margie English, IDHW
Tally Jenkins, DOE-ID

# ATTACHMENT

| # | Pg | Doc. / Sect | 60% ICDF RD COMMENTS<br>Issue | Suggestion |
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| 1. | | General | There is no explanation provided in the text why a different model (STOMP) has been adopted for the 60 % Phase Fate and Transport Modeling than had been used previously (Martian 2000) for the ICDF project. | The text should explain why the author considered it necessary to use a different model at this point in the ICDF project. The text should also include a comparison of both models and a description of what enhancement to predictive accuracies the new model presents. (JR) |
| 2. | | General | Both models clearly indicate a high sensitivity of contaminant migration rates to maintaining an infiltration rate 0.0001 m/yr. The recent modeling further suggests that an increase in infiltration to as low as 0.0005 m/yr will result in unacceptable COC concentrations in the SRPA. The values assigned to hydrologic input parameters that affect infiltration rates have not been verified thorough site specific testing but were developed matching characteristic curves. Parameters such as the saturated moisture content and vertical conductivity of basalt and interbed layers should be verified with site specific data to assure the validity of the assumed values. | The potential variation between assumed values and those actually existing at the site, considering the high degree of sensitivity of the infiltration rate, should be further examined. (JR) |
| 3. | | General | These modeling results indicate that the transport of contaminants of concern to the Snake River Plain Aquifer will be dependant on limiting infiltration rates to 0.0001 m/yr. Considering the half life of several of the contaminants, for example Iodine-129 and Technecium-99, maintaining the integrity of the landfill cover will be critical over extended time periods. | Additional information should be provided along with the details on materials and design features that will be incorporated into the landfill to insure that the protection of the cover over extended time periods. (JR) |

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| 4. | | General | Contaminant transport modeling was performed to develop Waste Acceptance Criteria for soil contaminant concentrations by ICDF. The modeling indicates that in order to achieve sufficient contaminant retention time, infiltration through the landfill cover must be limited to 0.0001 m/yr to prevent COC concentrations above MCL in the Snake River Plain Aquifer. The Waste Acceptance Criteria as proposed assumes that the cover can be maintained for a time period in excess of 1000 years. The basis for this assumption is unclear? | |
| 5. | | General | The text does not include discussion of how the cover infiltration rate will be verified and monitored after construction is completed and monitored over time and should. | |
| 6. | | General | The assumption that the design and maintenance of the cover will allow it to perform successfully over a time period exceeding 1000 years is difficult to substantiate. The effects of reconfiguring, thinning, and possible removal of portions of the engineered earth cover due to the effects of aeolian erosion over a time period exceeding 1000 years are of concern as the modeling predicts impact to the SRPA at even slightly higher infiltration rates. Loss of cover material will adversely affect the ability of the cover to limit the infiltration rate and result in increase contaminant concentrations in the SRPA. | Additional discussion is needed that identifies the long term O&M requirements and periodic testing and maintenance of the ICDF cover to insure the predicted performance of the cover. (JR) |
| 7. | | General | Perched water monitoring should be a component of the groundwater monitoring strategy. | The proposed Groundwater Monitoring DQO Objectives should include monitoring of perched aquifer water quality between the top of the basalt and the surface of the SRPA. Although the ICDF Percolation Ponds are currently a source of infiltration removing the ponds from service will take time to dry the perched aquifers. Therefore, the perched aquifers will continue to contribute contaminants to the SRPA and may confuse ICDF groundwater monitoring results. (JR) |

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| 8. | | General | Data is necessary, characterizing the vadose zone to define the current perched water qualities and gradients and distinguish their impact on groundwater quality of SRPAis needed for comparison to activities at ICDF. | |
| 9. | | General | The calculation of the soil contaminant concentrations used in the ecological risk assessment needs to be verified. It appears as if an error in the calculation of the soil contaminant concentrations may have increased the contaminant concentrations by three orders of magnitude. | |
| 10. | | General | The CAPP-88 outputs used for the NESHAP Modeling need to be provided in the 90% design document for review purposes. | |
| 11. | 2 | F&T Modeling Reslts & Sum Rpt,<br><br>§ 2.1, 5th ¶ | The text is confusing where it states that as a result of increasing the landfill footprint that "Therefore, the contaminant transport portion of the modeling increased by the specified recharge rates by a factor of 1.77." | Please include additional information to clarify the statement regarding how an increase in area of the landfill footprint was used to specify recharge rates. (JR) |
| 12. | 2-5 | F&T Modeling Reslts & Sum Rpt,<br><br>§ 2.1, 3rd ¶ | The use of the van Genuchen equations referenced in the model to describe moisture retention on porous media were developed to estimate moisture in interstitial pore space. Fluid flow thorough fractured basalt is generally assumed to be primarily through the open fractures and to a limited degree through weathered surfaces and sediment filled fractures. These factors could impact estimates of moisture retention characteristics of the vadose zone. (JR) | |

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| 13. | | F&T Modeling Reslts & Sum Rpt,<br><br>§ 2.1, 3rd ¶ | The text should reference the application of these equations in the description of groundwater and contaminant transport through unsaturated and fractured basalt to support their use as appropriate. Although the text references an INNEL report, Schafer et al, 1997, the text should include mention results of data or testing of the basalt that support the accuracy of the predictions made in the Schafer report. The EDF-275 should also include any references from formal hydrogeologic or mathematical literature that describe the application of these equations to fluid movement through fractured basalt. (JR) | |
| 14. | 2-6 | F&T Modeling Reslts & Sum Rpt,<br><br>§ 2 | The text states that "Synthetic materials that are part of the liner design were not included in the model stratigraphy, although they are expected to remain effective for thousands of years." The assumption that plastic polymer membranes will remain effective for thousands of years cannot be substantiated and the text should be amended to reflect this. (JR) | |
| 15. | 2-7 | F&T Modeling Reslts & Sum Rpt,<br><br>Table 2-3 | The contaminant transport properties listed in Table 2-3 include values for bulk density and vertical conductivity that may not accurately reflect the properties of the interbed materials across the site. The properties of the interbed materials are likely to vary locally in composition, grain size, thickness and may in some cases be absent altogether. The text should reference any sampling and testing reports that corroborate that the assumed values are representative of the interbed characteristics in the footprint and downgradient of the ICDF landfill. (JR) | |
| 16. | 4-1 | F&T Modeling Reslts & Sum Rpt,<br><br>§4, 4th Bullet | The text recommends that Tier 2 activities incorporate simulation of the removal of leachate from the landfill and evaluate the impact on estimated groundwater concentrations of the leachate constituents. The author should mention in the text the ultimate disposal location for the sludge residues remaining in the leachate evaporation ponds after landfill closure. (JR) | |

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| 17. | 1-1 | WAC EDF 10865<br><br>§1 last ¶ | It is not clear the significance of the SSSTF activities taking place within the AOC defined in the OU 3-13 ROD? Whether LDR requirements are triggered depends on the specific circumstances | |
| 18. | 4-5 | WAC EDF 10865<br><br>Table 1 | The compound RDX is included in this table along with a footnote stating that no design inventory has been identified for RDX, and that a 1.0 mg/kg concentration has been assumed. Given that UXO with RDX may be periodically discovered in the WAG 10-04 soils, a discussion is needed on the selection of 1.0mg/kg concentration used for simulation purposes. | |
| 19. | 5-8 | WAC EDF 10865<br><br>§ 5.3.1, 1st ¶ | The text that "....wastes not currently in the inventory will be discovered...." and "...this WAC will be developed using the same process...". It is likely that additional contaminants will be discovered at concentrations that exceed those that were assumed for the modeling. A logic tree is needed to evaluate additional WAC constituents. Also, needed is a discussion on how and when the ongoing inventory of radionuclides already accepted and disposed of in the ICDF will be reviewed, evaluated and reported to the agencies for review. | |
| 20. | 3-3 | Hydrogeo Modeling of Cover<br><br>§ 3.3.1, 1st ¶ | The text states that "The surface of the upper section will also provide erosion protection and promote surface runoff." The fine-grained characteristic of the soil proposed for this layer will promote runoff and moisture retention as previously noted in the text. However, the fine-grained soil will be subject to, and not provide protection from, erosion. The text should be amended to remove the mention of this layer as providing protection from erosion. (JR) | |

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| 21. | 5-1 | Hydrogeo Modeling of Cover<br><br>§ 5.1, 2nd ¶ | This section of the text discusses the most recent modeling runs conducted to assess the sensitivity of infiltration to the thickness of the landfill cover. The modeling, as is noted in the text shows, no significant increase in storage capacity of the cover with increased thickness of the cover. The text goes on to recommend a minimum cover thickness of 2 meters and then states " Additional material may be required to address erosion and aeolian effects." The text should include results and discussion of the modeling results when the cover is less than 2 meters thick. In addition, the statement regarding additional material should be clear that there will be requirements to maintain the cover in order to assure the design infiltration rate. (JR) | |
| 22. | | Hydrogeo Modeling of Cover<br><br>§ 6, Fig 6-1 | The modeling scenarios use Point D as the location to predict water storage breakthrough of the cover. Point D as shown in this diagram, at the apex of the slope of the landfill cover, is not the location that would be expected to develop the maximum hydraulic head. The side slope area near Point C would have combined effects of infiltration runoff and of saturation moving laterally in the soil subsurface which would increase with the distance traveled downslope. (JR) | |
| 23. | | Hydrogeo Modeling of Cover<br><br>§ 6, Fig 6-1 | The text should include discussion of why Point D was selected and whether the modeling results will be affected by moving the breakthrough point downslope in the vicinity of Point C. (JR) | |
| 24. | C-4 | App. C, GW Monit DQO<br><br>§C-3.1.1<br><br>PSQ | The principal study question is stated as "Has the operation of the ICDF landfill resulted in the release of contaminants into the environment beneath the landfill that could exceed RAOs in the SRPA?" It will be difficult to make this determination without including ground water data from the perched aquifers. | |

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| 25. | C-4 | App. C, GW Monit DQO<br>§C-3.1.1<br>PSQ | The current plan will identify releases directly below the landfill, but unless all such releases are considered a threat to SRPA, potential impact to SRPA water quality cannot be assessed. Without existing data on gradients and water qualities, the impact on the perched aquifers that a release would migrate to first and mix with cannot be measured. Without data to assess the effect on the perched aquifers an accurate prediction of the ICDF impact on the SRPA will not be possible. (JR) | |
| 26. | C-5 | App. C, GW Monit DQO<br>§C-4. 4th Input to Decision | The text states that groundwater sampling in the SRPA will be conducted to "...identify statistically significant evidence of contamination from the ICDF landfill." Please provide additional explanation in the text of how this determination will be made. As the ICDF will accept contaminated soils from the Chem Plant which is already suspected of impacting the water quality of the SRPA, it is not clear how additional degradation of groundwater quality will be attributable to the ICDF since they will have the same contaminants of concern. (JR) | |
| 27. ** | C-5 | App. C, GW Monit DQO<br>§C-5. 3rd ¶ | The text states that "The groundwater monitoring program will continue at a minimum throughout the active life of the ICDF and through the ICDF closure period." The text further provides an estimate based on a 15 year active and 30 year post closure period that would extend to the year 2048. Considering the longevity of several COCs and the projected travel time to reach SRPA the groundwater monitoring program will need to extend well beyond the year 2048. (JR) | |
| 28. | C-1-5-3 | Attach 1, Vadose Zone Monit, Leak Det. System<br>§ 4.2, 1st ¶ | The proposed limited extent leak detection system (LDS) and its orientation along the short axis of the landfill as depicted in Figure I-1 results in a significant area outside the monitoring area. The text should discuss the anticipated life of the geomembrane material and determine its functionality after the material deteriorates. (JR) | |

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| 29. | C-1-5-3 | Attach 1, Vadose Zone Monit, Leak Det. System<br><br>§ 4.2, 1st ¶ | Consideration should be given to the value of adding stainless steel suction cup lysimeters at both ends or midway between the limited LDS and the ends of the landfill to supplement the proposed LDS. (JR) | |
| 30. | | Attach 1, VZ Monit<br><br>Fig C-1 | The proposed monitoring locations for the SRPA monitoring wells shown in Figure C-1 and discussed in Section C-8, may not provide sufficient data to insure accurate evaluation of ICDF activities on the groundwater quality of SRPA. (JR) | |
| 31. | | Attach 1, VZ Monit<br><br>Fig C | The proposed down gradient monitoring well locations of USGS-112, and in particular USGS-113, do not appear to be in optimal down gradient locations as they are too far to the east of the ICDF. Groundwater flow contour data should be included in this figure to substantiate the ability of these wells to intercept potential contaminant releases from the ICDF. (JR) | |
| 32. | | Attach 1, VZ Monit<br><br>Fig C | The distance of two of the wells, at several thousand feet from the ICDF, are too far from the landfill to detect low concentrations of potential contaminants in the aquifer within a reasonable time frame. Also, the location of USGS-57, while required to assess potential impact close to the footprint of the landfill, may be too close if the lateral migration of contaminants across interbed materials results contamination entering the aquifer some at some point down or side gradient of the landfill boundary. | The proposed monitoring well location may need to be revised to provide an adequate monitoring network for the ICDF. (JR) |

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| 33.<br>** | | Attach 1, VZ Monit<br><br>Fig C | The proposed monitoring wells are all USGS installations which typically are constructed with long open bore hole configurations. The wells shown in Figure C-1, for example, have intervals open to the basalt formation that range from 119 to 225 feet in length. This design incorporates groundwater flow from many different horizons within the aquifer and will provide a blended water quality from multiple flow zones. This well design is not typically an acceptable configuration for groundwater monitoring wells due to the poor quality of groundwater data that they produce. (JR) | |
| 34. | | ICDF - Mstr Tbl of Docs, App A,<br><br>Sheet 2 of 2. | Cleanout risers are typically installed one per cell. If the pipes are separated, they would allow for easier detection of a leak. However, if the two pipes will be connected as shown on Sheet 2 of 2, it should be designed with a cleanout access capable of reaching all parts of the system with standard pipe cleaning equipment. (JF) | |
| 35. | B-5 | ICDF - Mstr Tbl of Docs, App B,<br><br>§ 1.1. | Description number 8 states that sediments that accumulate in the evaporation ponds will be sprayed using a nearby raw water hose to move the sediments to the sump area. However, a sump is not included in the design of the evaporation pond. Please explain. (JF) | |

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| 36. | 6 | SLERA for ICDF<br>§ 1.1.1 | The explanation of the soil exposure point concentration calculation is not accurate as it does not include use of a density for the landfill material. Since the landfill material density (kg per cubic meter) is not provided, the soil exposure point concentration calculations cannot be verified. It appears from using the presented maximum contaminant mass and the presented contaminant mg/kg that either the landfill material (contaminated soil) density used in the document is 1.5 $kg/m^3$ or the density is 1500 $kg/m^3$ and there was an error in units conversion. The 1500 $kg/m^3$ density of landfill material is consistent with what would be expected for contaminated soil. The description of how the soil contaminant concentrations are calculated needs to be enhanced to clarify the equation used. (JS) | |
| 37. | 6 | SLERA for ICDF<br>§ 1.1.1 | This section of the ecological risk assessment describes how the surface water concentrations in the evaporation ponds were calculated. The document states that "no organics were identified as concerns for the leachate in EDF-ER-274." This statement is not adequately supported in the ecological risk assessment. Additional information should be provided in the 90% design document. (JS) | |
| 38. | 36 | SLERA for ICDF<br>§ 2.1.1 | This section presents the exposure modeling to calculate the non-radionuclide dose to functional groups. The text states that water ingestion from the evaporation ponds is included in the exposure evaluation. The estimated exposure from water ingestion is not explicitly included. Although, the definition of the exposure variable is specified as being from all complete exposure pathways, water consumption and water contaminant concentration variables are not part of the exposure equation. The presentation of the equations should be revised in the 90% design document. (JS) | |

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| 39. | 41 | SLERA for ICDF<br>§ 2.3.1 | This section describes the diet parameter input values. The percent prey and the percent vegetation are described as one minus the percent soil. This text description on page 41 is not consistent with the parameter defaults presented in Table 10 on page 38. Also, the text on page 41 specifies that percent soil values were taken from Beyer 1994. The document does not specify the assumptions used when values were not available in Beyer 1994. For example, it does not specify whether the percent soil is assumed to be 2% of the food ingestion rate for burrowing mammals and birds that consume whole terrestrial prey. The discussion of uncertainty with the soil ingestion values on page 45 describes other literature sources used for these data in addition to Beyer 1994. The discussion on page 41 would be enhanced if: it were consistent with Table 10, included a list of literature sources used to obtain percent soil values; and included a discussion of assumptions used when literature values were not available. (JS) | |
| 40. | 53 | SLERA for ICDF<br>Fig. 7 | This figure presents the ICDF landfill ecological risk soil screening process. The second step in the figure is not consistent with the text and screening tables. Background soil concentrations are used as part of the screening. The screening tables indicate if contaminant concentrations are above EBSLs but are below background concentrations, the contaminant is not retained for the next level of screening. The figure does not include the comparison to background concentrations. (JS) | |

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| 41. | 76 | SLERA for ICDF<br>§ 5 | This section presents the ICDF SLERA summary and results. The results are not presented in a manner specific to soil exposure from the landfill and water exposure from the evaporation ponds. The results simply identify the contaminants that did not screen out and could potentially reach concentration levels of concern for the ecological receptors.. | The results would be more meaningful if the following were stated. The ecological risk characterization indicates that boron concentrations in landfill soil could potentially reach concentration levels of concern but ecological risk is not anticipated since soil exposure will be limited by a 2-ft clean fill layer maintained during facility operations and a biobarrier will be in place when the facility is completed. The ecological risk characterization indicates that combined exposure to arsenic in both the landfill soil and the evaporation ponds could potentially be of concern but ecological risk is not anticipated since soil exposure will be limited by a 2-ft clean fill layer maintained during facility operations and a biobarrier will be in place when the facility is completed. The risk characterization indicates that sulfate and vanadium concentrations in the evaporation ponds could potentially reach concentration levels of concern to ecological receptors. (JS) |
| 42. | | WAC ICDF | There are two different pages numbered as "5-2". Please correct. (JF) | |
| 43.<br>** | 3-1 | PRB Decision Analysis | This section states that the "ICDF landfill will be capped with a robust state-of-the practice cover to minimize long-term infiltration". However, if the permeable reactive barrier is in place prior to the capping of the landfill, it may aid in minimizing the infiltration during the active life of the landfill and reduce COPCs like I-129 in the Evap Pond. | |
| 44.<br>** | 4-1 | PRB Decision Analysis | There are reactive barrier materials, e.g., marine sediments, which will effectively retard I-129 movement into the leachate collection system | |

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| 45. | 2 | Evap Pond Lining Equiv Analy | The alternative design suggests 1-ft structural fill. Typically, an 18-inch fill is used in landfills. Please provide loading calculations to verify 1-ft of structural fill will be able to support the combined weight of the liners, landfill and heavy equipment. (JF) | |
| 46. | 9 | Evap Pond Lining Equiv Analy<br>§2.2.2 | Please remove the following sentence, "However, if one considers the operations layer as an integral component to the function ..." (and all other similar references). (JF) | |
| 47. | | Evap Pond Lining System | Figures 1-1 and 2-1 are missing from the text. Please insert them. (AP) | |
| 48. | 8 | Evap Pond Lining System<br>§2.2.1.1 | This section states, "The rate of leakage through lining systems with geomembranes due to permeation is negligible compared to the rate of leakage through geomembrane defects (Giroud and Bonaparte 1989a)." Please indicate the rate of leaking associated with "negligible," and how the liner used in the study by Giroud and Bonaparte is essentially the same as the liner that would be manufactured for this project. (AP) | |
| 49. | | ICDF CQA Phase 2<br>§5 | It should be stated in the QA plan that prior to gravel placement, the CQA monitor and field inspectors will verify and document that the gravel is of the round type as to not tear the liner above or below it. (JF) | |
| 50. | | ICDF NESHAP Modeling<br>Tbl 7 | Although "a" represents a value that is already accounted for in the landfill calculations, a footnote should be added to explain this to the reader. (JF) | |
| 51.<br>** | 25 | ICDF Complex NESHAP Modeling | The maximum exposed individual (MEI) for the NESHAP modeling was assumed to be at the site boundary. However, the modeling should include scenarios for on site non-DOE workers to address short-term risk concerns. (JF) | |

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| 52.<br>** | 2 | Waste Placement Maping | Section 1.2.2 states that a grid system of 50-ft by 50-ft with a maximum of 5-ft layers will be used at the landfill. A grid spacing of 25ft x 25ft x 5 ft is more appropriate for waste tracking purposes and ARAR compliance. | Please discuss exactly how these grids will be established (i.e., will the points be surveyed in, paced off, or marked off using measuring wheel, etc.). Also include the frequency at which the grids will be marked off and who will be preforming this task. (JF) |
| 53. | | DOE/ID-10925, Appendix A, Dwg C-303, Detail 5. | The detail illustrates a stepped connection of the new compacted clay liner with the existing clay. Vertical cuts do not allow for adequate kneading of the clay during construction which will provide for an integral clay layer bond between the new and existing clay. | A better suggestion is to back cut the clay on a slope allowing for the compaction equipment to operate on both the new and existing clay, kneading the two zones together into an integral layer. (RH and WF) |
| 54.<br>** | B-4 | DOE/ID-10925, §1.1, Items 2 & 3 | The focus of the contamination appears to rest on TSS for the decision to direct the liquid waste to the ICDF evaporation pond. As the design inventory will become an operational limitation, other CERCLA waste constituents should be addressed, e.g., organic solvents. | |
| 55. | C-5 | DOE/ID-10925, §C-4, Items 3 & 4 | How are these objectives to be accomplished given the fact that the vadose zone is several hundred feet thick and contains some significant gravel layers? (RH) | |
| 56. | C-1-5 | DOE/ID-10925, §4.1, 2nd ¶ | The neutron scattering method is being described as a soil moisture monitoring method. How will landfill leakage contributing to groundwater contamination which contain radionuclides interfere with the proposal to use the neutron scattering method? (RH) | |

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| 57.<br>** | C-1-5 | DOE/ID-10925, §4-1, Last ¶ | This discussion about potential natural increases in soil moisture appears to be a catch all to indicate that any detectable increases in soil moisture will probably be the result from sources other than the landfill. The stated reasons are probable, but placing an impermeable layer that prevents natural groundwater recharge must also figure into the analysis. Increases in soil moisture should first be assumed to originate from the landfill. (RH) | |
| 58. | C-1-5 | DOE/ID-10925, §4-2, 1st ¶ | Several states require leak detection systems as part of the landfill design and the landfill operators can successfully compete on economical terms with landfills that do not have such systems. It appears from the text that the authors have determined a leak detection system is not economical without justification. (RH) | |
| 59. | C-1-8 | DOE/ID-10925, §5, 2nd ¶ | The use of drain sands can be improved upon for this application. The problem with the use of sands is that the void space will have a moisture retention capacity and liquid flow must overcome the capillary attraction created by the sand particles. The installation of a geocomposite drainage media allows for minimal moisture retention when dealing with small flows and allows for faster transmission time to the sample extraction location. (RH) | |
| 60.<br>** | C-1-8 | DOE/ID-10925, §5, 2nd ¶ | The proposed tertiary leak detection system is only 22 feet wide (corresponding to the roll width of HDPE liner) and is located under the lowest longitudinal location of the landfill liner. This proposal does offer a very good economical suggestion for groundwater collection from the vadose zone under the liner with the highest risk of leaking. The proposal to place only 22 feet of HDPE under the landfill as a proactive method of collecting landfill leakage does not address the balance of the landfill area, other than to rely on traditional groundwater interception at a monitoring well. (RH) | |

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| 61. | C-1-8 | DOE/ID-10925, §5, | A tertiary leak detection system is proposed for the landfill liner. What is the reasoning that a similar system is not required for the ICDF evaporation ponds? (RH) | |
| 62. | C-1-5 | DOE/ID-10925,<br>App D<br>Fig 1-2 | Please include a geotextile, or preferably a geocomposite layer between the drain sand and the drain gravel forming the sump area for the tertiary leak detection system. The drain sand must be separated from the drain gravel. The logic for the geocomposite was presented above in the comment for Page C-1-8, §5, 2nd ¶. (RH) | |
| 63.<br>** | 4-1 | DOE/ID-10865, WAC for ICDF Landfill,<br>Table 4-1. | The statement about the permeable reactive barrier (PRB) should be qualified to "after landfill closure". The landfill cap will not provide any protection to human health and the environment prior to completion. How does *not* having a PRB affect the decision logic of the WAC? The logic should proceed with protection of the PRB via the WAC, if the PRB were to be installed. (RH) | |
| 64.<br>** | 5-2 | DOE/ID-10865, WAC for ICDF Landfill,<br>§5.1.6 & 7 | While not specifically stated in §5.1.6, gas disposal is effectively prohibited due to the restrictions. Why then accept any gas containers that are pressurized? Pressurized gas containers are subject to container structural collapse leading to landfill subsidence. Concerns have been raised previously during the 30% design review meetings about landfill subsidence. (RH) | |
| 65. | 5-7 | DOE/ID-10865, WAC for ICDF Landfill,<br>§5.2.6 | Please explain with operational details how the WAC gas generation is to be limited to 1.5 atmospheres if this requirement remains a valid criteria. (RH) | |
| 66. | 5-8 | DOE/ID-10865, WAC for ICDF Landfill,<br>Tbl 5-3 | If the ICDF design assumption is based upon the boxes being filled, then the requirement should be stated as, "...boxes will be completely filled with waste, or other inert material to achieve zero void space." (RH) | As some settlement of the contents is anticipated during handling, the 5% void space should be a "not-to-exceed" criterion. |

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| 67. | 5-8 | DOE/ID-10865, WAC for ICDF Landfill,<br><br>Tbl 5-3 | Steel plates in a size up 4 feet by 20 feet will be allowed into the landfill. This size appears to be excessive when compared to other landfill operating statements that waste placement and operations are to be designed to limit settlement and subsidence. This large size steel plate provides a good foundation for additional waste, but potentially allows for void space to be constructed into the waste fill under the plate. (RH) | |
| 68. | 5-31 | DOE/ID-10865, WAC for ICDF Landfill,<br><br>§5.4.6 | To minimize subsidence, waste will be compacted to a minimum of 20 psi. Does this mean a minimum compactive effort of 20 psi shall be applied to the waste placement when filling a container? (RH) | |
| 69. | 5-31 | DOE/ID-10865, WAC for ICDF Landfill,<br><br>§5.4.6 | Waste shall fill at least 95% of the container does not comply with the section heading to minimize subsidence. Containers should be completely filled with waste, or other inert material to minimize subsidence. (RH) | |
| 70. | 1-2 | DOE/ID-10866, WAC for ICDF Evap Pond,<br><br>§1.2. | The OU 3-13 ROD identifies the purpose of the ICDF Evaporation Pond, "... for purpose of managing ICDF leachate and other aqueous wastes generated as a result of operating the ICDF complex." It does not state, "...generated in the ICDF complex..." Part of the ICDF complex is the SSSTF whose purpose is to manage INEEL CERCLA wastes. It should be clarified that the evaporation pond may be used to treat WAC acceptable aqueous waste streams sent to the SSSTF. | |
| 71. | 1-3 | DOE/ID-10866, WAC for ICDF Evap Pond,<br><br>§1.2.1<br>2nd Bullet | Regarding the last sentence describing that, "All of the waste in the current design basis inventory can be accepted ... without treatment." The last two words do not fit with the section heading describing waste volumes and appears to be a way to gain regulatory approval to dispose liquid waste into the ICDF ponds. The purpose of the document is to establish criteria for disposal. (RH) | |

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| 72.<br>** | 1-6 | DOE/ID-10866, WAC for ICDF Evap Pond,<br><br>§1.4.2<br>4th Bullet | The evaporation pond has different design requirements from the ICDF liner system. The logic that 60 mil HDPE is acceptable for the landfill liner does not automatically extend to the pond. The design of the landfill liner has assumed that the HDPE liner does not provide a benefit during the liner system evaluations during the design life of the facility. The pond is designed to be continuously flooded and the leachate characteristics will be different from the landfill. Evaporation of the pond liquids may concentrate the chemical makeup of the leachate, and addition of liquid waste may dilute those chemical characteristics. The pond liner is also subject to wind, thermal, and UV forces in addition to the additional chemistry and constant contact with radio nuclides. A question raised during the previous 30% design meeting about the resistance of HDPE polymer to radioactive degradation of the polymer chain has not been answered for the landfill liner and more importantly to the integrity of the pond liner, considering the forces to be resisted. An EPA Method 9090 test is appropriate to provide a demonstration of leachate compatibility, if there can be agreement about the chemical characteristics of the leachate the pond might be subjected to. (RH) | |
| 73.<br>** | 2-1 | DOE/ID-10866, WAC for ICDF Evap Pond,<br><br>Tbl 2-1 | All ICDF leachate is acceptable only if an approved WAC with agency acceptance of waste profile through approval of the WAC. Any new waste profiles need to be pre-approved by the agencies as a modification of a primary document, i.e., the O&M plan. Also, agencies' oversight on the leachate chemistry delivered to the evaporation pond, should be based upon the EPA Method 9090 testing results. | |
| 74. | 2-1 | DOE/ID-10866, WAC for ICDF Evap Pond,<br><br>Tbl 2-1 | Since the pond liquid is constantly changing, the quantity and composition of the liquid waste being discharged into the evaporation pond should be monitored and managed to maintain a chemical condition below WAC threshold. | Monitoring can be established from the EPA Method 9090 testing for the pond liner. (RH) |

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| 75.<br>** | 3-3 | DOE/ID-10866, WAC for ICDF Evap Pond,<br>§3.5.1 | Waste profile sheets of the ICDF leachate and also the evaporation pond should be prepared to manage the chemical condition of the pond liquid below some threshold established from the EPA Method 9090 testing for the pond liner. (RH) | |
| 76. | 4-1 | DOE/ID-10866, WAC for ICDF Evap Pond,<br>Tbl 4-1 | See previous discussion for §1.4.2, 4th bullet regarding the issue about pond liner acceptance based upon landfill liner acceptability. (RH) | |
| 77. | 4-2 | DOE/ID-10866, WAC for ICDF Evap Pond,<br>§ 4.1.3 | The conclusions of this section rely on information provided in Appendix A. The documentation of Appendix A, is scheduled for presentation in the 90% submittal and therefore was not evaluated at this time. (RH) | |
| 78.<br>** | 4-3 | DOE/ID-10866, WAC for ICDF Evap Pond,<br>§ 4.1.4.2 | ARAR requirements are for the liner to be constructed of materials to be resistant to the wastes that will be managed in the impoundment. This requirement has not been clearly demonstrated given the changing nature of the chemistry of the liquid within the ICDF evaporation pond. (RH) | |
| 79.<br>** | 4-4 | DOE/ID-10866, WAC for ICDF Evap Pond,<br>§ 4.2 | The analysis for worker risk is incomplete for reasons stated in the text. Consideration of the concentration of pond liquid chemistry due to liquid evaporation is necessary when completing the analysis for worker risk. (RH) | |
| 80. | 3-2 | EDF-ER-279, .. Hydrologic Modeling ...,<br>§3.1, 4th ¶. | The intent of the analysis is to demonstrate the ability of the landfill cap to withstand potential changes in climate and environment over the 1,000 year design life. The perceived advantage of short duration storms requires analysis to determine how sensitive the cap is to changes in climate. (RH) | |

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| 81.<br>** | 3-3 | EDF-ER-279, .. Hydrologic Modeling ...,<br>§3.2, 2nd ¶. | The selection of a poor stand of grass along with the SCS run-off curve number of 79 tends to increase the amount of water run-off from the landfill cap. These assumptions maybe realistic, but the range of alternatives should be modeled since this is a constructed facility to design specifications. What happens if the grass stand is good and more infiltration occurs? (RH) | |
| 82.<br>** | 3-5 | EDF-ER-279, .. Hydrologic Modeling ...,<br>§3.3.2, 1st ¶. | The larger the difference in hydraulic conductivity, the better performance a drainage layer will have. The assumption that sands will have a minimum hydraulic conductivity of 1 x $10^{-2}$ cm/sec is optimistic. This is a highly processed sand with unique qualities. A more realistic value is sand with a minimum hydraulic conductivity of 1 x $10^{-3}$ cm/sec, or even 1 x $10^{-4}$ cm/sec for the sands native to the ICDF area. (RH and WF) | |
| 83.<br>** | 4-3 | EDF-ER-279, .. Hydrologic Modeling ...,<br>§4.3, 2nd ¶. | Based upon the analysis presented, it appears that changing the assumption for the drainage area will not make much difference. A better assumption generating the most runoff into the burrow hole would result from a hole located at the top of slope allowing for runoff from half the cap length and maybe 1 meter wide to enter the hole. (RH) | |
| 84. | 6-1 | EDF-ER-279, .. Hydrologic Modeling ...,<br>Tbl 6-1 | The column headings are missing appropriate adjectives, such as "average" and "maximum". (RH) | |

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| 85.<br>** | i | EDF-ER-273, I...<br>Permeab<br>Reactive Barrier<br>...<br>Title Page | The permeable reactive barrier (PRB) appears to be compared to the design life of the ICDF as 1,000 years. No discussion is offered about how long the PRB is anticipated to last and what short term benefits that a PRB can provide. The study objective is to determine if the remedial action objectives (RAOs) are in compliance with the design. An important and consistent assumption is that compliance occurs after installation of the cap. This assumption is a self fulfilling prophesy since the cap is suppose to achieve RAOs, but artificially moves the start time of zero out to 15 years at the time of cap placement thereby leaving the first years of landfill operation unprotected. The PRB has a primary purpose to neutralize chemistry of leachate prior to entering the SRPA, which essentially limits the required design life to say the first 20 years of landfill life (say 15 years open and 5 years of dewatering) with the cap to provide the protection after dewatering the landfill. Some discussion of the time line and the potential effectiveness of the PRB should be presented from time zero of the start of landfill operations. Alternatively, the PRB may be made more effective if it is constructed under the primary liner? (RH) | |
| 86.<br>** | iii | EDF-ER-273, ...<br>Permeab<br>Reactive Barrier<br>...<br>Abstract | The logic presented in the PRB analysis gives the appearance that the choice is either a PRB or a 1,000 year landfill cap. The PRB analysis is to demonstrate if there is a protection to the Snake River Plain Aquifer (SRPA). (RH) | |
| 87.<br>** | 2-1 | EDF-ER-273, I...<br>Permeab<br>Reactive Barrier<br>...<br>§2, 1st ¶ | It is unclear how the word "conservative" is being used to describe the contaminant mass within the landfill. Is the meaning such that the contaminant mass is being overestimated in the computations for analysis of the PRB, or is it that the contaminant mass is being underestimated? Either description should be further described and what impact this decision has on the final analysis. (RH) | |

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| 88. | 3-5 | EDF-ER-273, ... Permeable Reactive Barrier ..., §3.2, 2nd ¶. | The discussion about Table 2 presents information about several chemical compounds that are expected to change in concentration over the landfill design life, but the discussion terminates prior to reaching a conclusion on how these compounds are to be addressed. (RH) | |
| 89. | 3-7 | EDF-ER-273, ... Permeable Reactive Barrier ..., §3.2, 1st bullet | The statement that most of the chemical constituents are anticipated to be below the remedial action objectives appears to indicate that dilution is the solution to not having a PRB. The purpose of the PRB analysis is to determine if there is a health and environmental benefit from installing a PRB. (RH) | |
| 90. | 3-7 | EDF-ER-273, ... Permeable Reactive Barrier ..., §3.2, 2nd bul | This statement infers that waste will be treated prior to disposal to achieve chemical concentration limits? Is this the correct interpretation? (RH) | |
| 91. ** | 3-7 | EDF-ER-273, ... Permeable Reactive Barrier ..., §3.3, 2nd ¶ | The infiltration rate is estimated at 1 cm/year for this analysis. Is this an adequate infiltration rate and how was the value derived? There has been information provided elsewhere in the 30% design about moisture addition to the landfill to control dusting and fugitive emissions. Therefore, the waste mass may be approaching field capacity for moisture addition when nature adds moisture. (RH) | |
| 92. | 3-5 | EDF-ER-273, ... Permeable Reactive Barrier ..., §4.2, | Some very significant operational and design assumptions were used to arrive at this conclusion. Those assumptions should be summarized for inclusion into the ICDF design. (RH) | |
| 93. | 5 | EDF-ER-312, Evap Pond Lining System Equiv ..., §2, 4th ¶ | The principal design issues are enumerated in this section. Logic indicates that wind uplift of the sacrificial liner is a concern at the end of the pond life when the pond liner is dry, but contains radioactive sediment that could be discharged into the atmosphere due to wind uplift. (RH) | |

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| 94. | 6 | EDF-ER-312, Evap Pond Lining System Equiv ... ,<br><br>§2.2.1, 1st ¶ | Typo: The drawing is correctly entitled Slope Stability Assessments, not "Slop". (RH) | |
| 95. | 18 | EDF-ER-312, Evap Pond Lining System Equiv ... ,<br><br>§3, last ¶ | Water is the liquid component for the GCL flux analysis, but the conclusion reached is for the hazardous constituents. It appears reasonable to evaluate the GCL performance of the pond liner based upon water. Is there a chemical limitation for solvents in which the performance of the GCL begins to decrease, or becomes unacceptable as a substitute for clay? (RH) | |
| 96. ** | I-6 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§2.1.2.10 | The intent of the CQA monitor is to perform as an independent third party observer. The CQA monitor should not have authority to *direct the activities of the field inspection team and laboratory technicians* unless these are also employees of the CQA monitor. The CQA monitor should certainly educate the field and laboratory technicians on the CQA requirements and procedures, but direction should only come from the CQ Engineer that is assumed from Figure 2-1 that the field inspection team and technicians report to the engineer. (WF) | |
| 97. ** | I-6 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§2.1.2.11 | The CQA certifying officer should be given the authority to recommend a work stoppage and possible remedial actions to the Regulating Agencies. Figure 2-1 should be corrected to show the CQA certifying agent is responsible to the Regulatory Agencies, not the Procurement Agent. This would ensure that the CQA certifying officer is an independent, third-party team member. (WF) | |

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| 98. | I-6 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§2.2. | A particular team member should be designated as responsible for coordinating each type of meeting. At a minimum, the coordination tasks should include preparing an agenda, notifying the appropriate project personnel that should attend a particular meeting, and insuring that minutes are taken and dispersed appropriately. (WF) | |
| 99. | I-8 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§2.2.2 | The meeting should not be documented in the field books. The meeting minutes should be kept in a separate project job file and distributed to a designated list. Field books should only include observations made in the field. (WF) | |
| 100.<br>** | I-11 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§3.5. | The geosynthetic laboratory shall have GRI certifications for the test methods to be performed. (RH) | |
| 101.<br>** | II-4 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§3.1. | To minimize systematic errors with the rapid water content (ASTM D3017) and total density (ASTM D2922) measurements, at least the first 10 test values should be cross checked against conventional methods. The rapid water contents should be compared to oven moisture contents (ASTM D2216), and the rapid total densities should be compared to densities determined by either the sand cone (ASTM D1556) or rubber balloon (ASTM D2167) methods. Graphs that plot the rapid test values against the conventional test values should be prepared, and a correction value should be determined by the CQA Monitor. As the construction process continues, one in every 10 rapid water contents and one in every 20 rapid total densities should be cross checked against conventional methods. . | These additional measurements should be added to the original cross check graphs, and the CQA Monitor should determine if the correction values should be modified based on the additional test values. The test frequency intervals for the conventional testing are included in the EPA technical guidance document (EPA/600/R-93/182 QA and QC Control for Waste Containment Facilities, September 1993). (WF) |

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| 102. | II-8 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§4.2.1.1. | The base soil should be tested for water content. This test value is particularly important because the process of mixing bentonite with the base soil will be more effective at water contents that are dry of optimum water content, and less effective at water contents wet of the optimum water content. The same frequency specified in Table II-3 for the post compaction of the CCL should be used. (WF) | |
| 103.<br>** | II-9 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§4.2.2. | The same procedure discussed for minimizing the systematic errors with the rapid water content and total density of the subgrade should be used for the CCL. The initial measurements could be obtained as part of the test pad construction. (WF) | |
| 104.<br>** | II-16 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -2 | Minimum frequency of testing for CQA evaluation of prepared subgrade. Both of the conventional test methods for total density, the sand cone and rubber balloon methods, should be included at a frequency of one for every 20 rapid tests. It should be noted that the gauge calibration method described in ASTM D2922 includes using several large reference blocks that vary in density over the range representative of the density of the materials to be tested. The blocks should have minimum dimensions of 24" X 17" X 12", and are typically made from aluminum, magnesium, aluminum/magnesium, granite, and limestone. The reference blocks are not commonly used in the building construction industry. For the ICDF facility, the CQA Plan should clearly list this additional requirement to prevent its oversight. (WF) | |
| 105. | II-16 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -2 | Minimum frequency of testing for CQA evaluation of prepared subgrade. The oven water content testing frequency should be revised to one for every 10 rapid tests. (WF) | |

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| 106.<br>** | II-17 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -3 | Minimum frequency of testing for CQA evaluation of clay liner. The base soil should be tested for water content during preprocessing at the frequency of 5 per acre or a minimum of 1 per day. (WF) | |
| 107. | II-17 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -3 | Minimum frequency of testing for CQA evaluation of clay liner. Curing should be defined in a note below the table. (WF) | |
| 108.<br>** | II-17 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -3 | Minimum frequency of testing for CQA evaluation of clay liner. Both of the conventional test methods for total density, the sand cone and rubber balloon methods, should be included at a frequency of one for every 20 rapid tests. The drive cylinder method, ASTM D2937, should also be considered for cross checking the rapid test method. (WF) | |
| 109. | II-17 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -3 | Minimum frequency of testing for CQA evaluation of clay liner. The number of passes and the definition of what constitutes a pass should be defined in a note below the table. (WF) | |
| 110. | II-18 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>Tbl II -5 | Minimum frequency of testing for CQA evaluation of gravel. State the maximum carbonate content that allows the reduced testing frequency. (WF) | |
| 111.<br>** | III-1 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§1.4 | Add bentonite mass per unit area test, ASTM D5993, and the swell index test, ASTM D5890, to the list of conformance tests. These two tests are recommended in the EPA technical guidance document (EPA/600/R-93/182 QA and QC Control for Waste Containment Facilities, September 1993). (WF) | |

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| 112. | III-1 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§1.4 | Manufacturers will not provide a minimum value for grab strength for a fabricated roll of GCL. They will only provide values for the geotextile or geomembrane before they are fabricated into the GCL. Therefore the grab strength test, ASTM D4632, does not provide a useful test value for the GCL delivered to the site, and should be deleted as a QA requirement. (WF) | |
| 113. | III-1 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§1.4 | The permeability test, ASTM D5084, is very difficult to perform for a GCL and impractical when the GCL includes a geomembrane. The geomembrane will lower the overall permeability of the GCL by at least four orders of magnitude, thereby masking the permeability of the bentonite component of the GCL. The test is difficult to perform when the GCL includes a geotextile because of the imprecision of measuring the thickness of the GCL inside of the triaxial cell. The thickness is a parameter in the permeability calculation. This difficulty is the reason that manufacturers prefer measuring flux, ASTM D5887, which does not use thickness as a test parameter. Therefore, the acceptable QA test should be ASTM D5887 with ASTM D5084 being deleted. (WF) | |
| 114. | III-1 | DOE-ID-10851, ICDF CQA Plan for Phase 2,<br><br>§1.4 | The interface shear strength test, ASTM D5321, is more a design value test and not a practical conformance test. The test should be performed during design to confirm the design assumptions, not during construction as a conformance test. If requested as a conformance test, a list of test conditions should be included. Among the most important are the range of normal stresses, the speed of displacement, whether the GCL should be immersed in water, and the adjacent liner components that the GCL should be sheared against. Performed properly, the significant problem with this test to document conformance is the minimum one week turnaround time that a laboratory will typically require to perform the test. This test should be deleted. No substitute test is available to measure conformance. (WF) | |

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| 115. | 2 | EDF-ER-290, ICDF NESHAP Modelling, §2. | The last bullet under landfill details the assumed density of the soil to be 95 pounds per cubic foot per the stated reference. Is this density value for the landfilled waste material rather than soil? (RH) | |
| 116. | 2 | EDF-ER-322, Waste Placement Mapping,<br><br>§1.2.3 | The recommendation for the visual use of a grid system is acceptable, but frequently has difficulties with the vertical component. The visual method should be supplemented with either GPS or survey method at least monthly. (RH) | |